Volume 18 June, 1953 Number 2

# CASTANEA

## The Journal of the Southern Appalachian Botanical Club

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All persons interested in the botany of the Southern Appalachian Mountains are invited to join the club. Dues, including subscription to the Journal, are $3.00 per year. Single copies of *Castanea*, seventy-five cents.

Notes and short scientific papers relating to the botany of the region are welcomed and will be published to the extent that the size of the Journal allows.

Authors will receive six gratuitous copies of the issue in which their papers appear. Separate reprints, if ordered in advance, will be furnished at cost.

# CASTANEA

## The Journal of the Southern Appalachian Botanical Club

Volume 18 June, 1953 Number 2


## The Violaceae in Western Pennsylvania*†

By L. K. Henry

The violets are among our most showy spring flowers, but because of minute differences, and hybridization among the species, they have always been difficult for amateurs to determine. It is hoped that the present article, with keys, and brief descriptions giving mainly the important differences, will be helpful to all interested in the violets of our region.

This report is based upon the violet collections in the Carnegie Museum Herbarium. A complete description of each species is not given, since such is found in *Gray's Manual of Botany*, eighth edition, covering the flora of the central and northeastern United States and adjacent Canada. Under the violet family in the Manual, two genera, fifty-two species, and eleven varieties are described, and numerous hybrids are listed. Both genera are found in Western Pennsylvania: *Viola* is represented by thirty species, seven varieties, five forms, and ten hybrids, and the genus *Hybanthus* by a single species, according to our present collections. A generalized statement on the distribution of the more common species is given, while exact collection data are listed for those that are rare or less frequent in occurrence. The ten hybrid violets found in our region are placed at the end of the treatment of the species, and their outstanding characteristics and distribution are given.

One of the hybrids, *Viola canadensis* × *pubescens*, has not previously been reported, as far as the author can determine. One species, *Viola allegheniensis*, and two forms, *V. affinis* f. *albiflora* and *V. hirsutula* f. *albicans*, are described as new.

*Aided by a grant from the Rockledge Garden Club of Allegheny County, Pennsylvania.

†The publication of the illustrations accompanying this paper has been aided by a grant from Carnegie Museum.

In Western Pennsylvania we have such varied habitats—glaciated or unglaciated soils, deciduous or mixed northern hardwood forests, Canadian or Carolinian life zones, etc.—that naturally many different species are found here, some of which have migrated into the region from the Southern Appalachians, the Mississippi Valley, or the Northern Hardwood region. For example, *Viola pedata* ranges north, on red clay soils, into only the southeastern part of our region; *V. rotundifolia* comes south in the mountains; and the northern limit of *Viola hastata* occurs here.

The eastern border of "Western Pennsylvania" has arbitrarily been chosen as the eastern borders of Potter, Clinton, Centre, Huntingdon, and Fulton counties. The initials following the collection data are to be interpreted as follows: FHB, F. H. Beer; JB, John Bright; WEB, W. E. Bunker; LKH, L. K. Henry; OEJ, O. E. Jennings; DEL, Dorothy E. Long; JAS, John A. Shafer.

### Key to Violaceae

The *Violets of North America*, by Ezra Brainerd, published by the Vermont Agricultural Experiment Station in 1921, and *Wild Violets of North America*, by Viola Brainerd Baird, published by the University of California Press in 1942, were most helpful in this study.

Sepals not auricled; petals green, fleshy, lower one not spurred; stamens united into a sheath ..... 1. *Hybanthus concolor*
Sepals auricled; petals colored or white, not fleshy, lower one spurred; stamens distinct ..... *Viola*

### Key to the Genus Viola in Western Pennsylvania

1. Plants stemless.
   2. Petals all beardless; leaves pedately cut.
      3. Flowers with the two upper petals dark violet, other petals pale lilac or deep lilac-purple .... ..... 2. *V. pedata.*
      3. Flowers with all the petals blue or bluish-lilac; leaves dissected into linear divisions ... 3. *V. pedata* var. *linearioba.*
   2. Lateral petals (and sometimes the spurred one) bearded.
      3. Flowers commonly blue, violet, purple or lilac; rhizome not stoloniferous.
         4. Leaves mostly lobed or divided.
            5. Leaves pubescent.
               6. Leaves lanceolate to oblong-ovate, hastately lobed near base.
                  7. Leaves oblong-ovate; sepals ciliate. (Both unlobed and glabrous forms occur.)

8. Flowers violet to blue-violet .... 16. *V. fimbriatula.*
8. Flowers blue-gray with blue lines and dark eye-spot; tips of petals becoming white. 17. *V. f.* forma *albescens*

7. Leaves lance-oblong or narrowly lanceolate; sepals not ciliate ..... 19. *V. sagittata.*

6. Leaves cordate-ovate, some or all palmately or pedately lobed.
7. Leaves both lobed and unlobed, later ones pedately 3-5 lobed; sepals slightly ciliate ..... 20. *V. triloba.*
7. Leaves both lobed and unlobed, the lobed leaves pedately cut nearly to base into 5-7 narrow segments ..... ..... 21. *V. t.* var. *dilatata.*
7. Leaves all palmately divided into 5-11 narrow lobes; sepals ovate, ciliate ..... 22. *V. palmata.*

5. Leaves mostly glabrous.
6. Leaves triangular, one-half to nearly as broad as long, only slightly, if at all, blunt-lobed at base .... 18. *V. emarginata.*
6. Leaves lance-oblong or narrowly lanceolate, 2-3 times as long as broad, somewhat hastately lobed at base; unlobed forms occur ..... 19. *V. sagittata.*

4. Leaves unlobed, crenate, dentate, or serrate.

5. Expanding leaves, petioles, and peduncles glabrous or only sparsely pilose or pubescent; leaves cordate-ovate, reniform, or cordate-deltoid.
6. Beard of lateral petals clavate with knob-like tips; flowers high above the leaves; growing in wet places.
7. Corolla blue-violet, usually with darker center ..... ..... 4. *V. cucullata.*
7. Corolla white ..... 5. *V. c.* forma *albiflora*

6. Beard of lateral petals not strongly knobbed.
7. Spurred petal beardless at base; flowers among or slightly above the ovate to reniform, acute-tipped leaves; sepals ovate-lanceolate, not ciliate.
8. Corolla violet with pale center ... 6. *V. papilionacea.*
8. Corolla white with pale blue lines on lower petals .. ..... 7. *V. p.* forma *albiflora.*
8. Corolla pale grayish, heavily veined with blue at base. ..... 8. *V. Priceana.*

7. Spurred petal somewhat bearded or villous at base.
8. Leaves at flowering time broadly cordate with short deltoid tips; sepals blunt and glabrous; petioles granulose at apex; growing in woods ..... 9. *V. latiuscula.*

8. Leaves at flowering time narrowly ovate-cordate, tapering to acutish tip, sometimes with strigose hairs above and/or beneath; sepals glabrous, acute; petioles and peduncles smooth.
9. Flowers violet ..... 10. *V. affinis.*
9. Flowers white ..... 11. *V. a.* forma *albiflora.*

5. Expanding leaves, petioles, and usually peduncles definitely pubescent.
6. Leaves at flowering time pubescent beneath.
7. Spurred petal villous at base; leaves cordate-ovate, lower surface of young leaves and petioles sparsely hirsute or hispidulous; sepals closely ciliate. ..... ..... 13. *V. septentrionalis.*
7. Spurred petal glabrous or only sparsely hairy at base; leaves round-cordate to reniform, with abrupt tip; young leaves and petioles strigulose to villous, mature ones often glabrescent to glabrous; sepals ovate-oblong, more or less ciliate toward the base ..... ..... 12. *V. sororia.*
6. Leaves at flowering time glabrous and purplish beneath, strigose above, round-cordate to ovate with acute tip; sepals ovate, glabrous or with few cilia.
7. Flowers violet ..... 14. *V. hirsutula.*
7. Flowers white with blue veins 15. *V. h.* forma *albicans.*

3. Flowers fragrant, violet; rhizome cord-like, stoloniferous; leaves broadly cordate-ovate, finely pubescent; an escape from cultivation ..... 30. *V. odorata.*

3. Flowers white with purple lines; rhizome slender, stoloniferous.
4. Leaves cordate-ovate to reniform with deep basal sinus.
5. Leaves glabrous; upper petals broadly obovate, the laterals beardless; growing in wet places ..... 23. *V. pallens.*
5. Leaves with scattered pubescence above and beneath and on the greenish petioles and peduncles; upper petals broad, not strongly reflexed, laterals bearded; growing in damp or wet places ..... 24 *V. incognita.*
5. Leaves with scattered pubescence above, often only a few hairs on lobes, glabrous beneath; petioles and peduncles glabrous ..... 25. *V. i.* var. *Forbesii.*
5. Leaves with scattered pubescence above, glabrous beneath; petioles and peduncles often reddish; upper petals narrow and strongly reflexed, laterals beardless ..... 26. *V. blanda.*

4. Leaves lanceolate, tapering into margined petioles .... ..... 27. *V. lanceolata.*

4. Leaves oblong to ovate, gradually rounded to subtruncate above the broadly decurrent summit of the petioles. .... ..... 28. *V. primulifolia* var. *acuta.*

3. Flowers yellow, expanding before the leaves; mature leaves rounded to elliptical, thick and dark green; rhizome stout, not stoloniferous ..... 29. *V. rotundifolia.*

1. Plants with leafy stems.

2. Flowers yellow or white with violet tinge on back; leaves undivided; stipules entire or crenulate.

3. Leaves hastate, 2-4 at apex of stem, glabrous, sometimes darkly veined or mottled; petals purplish on back ..... ..... 31. *V. hastata.*

3. Leaves broadly ovate, usually 1-3 basal ones, thinly pubescent or glabrate; stem smooth or somewhat pubescent; petals often purplish on back; stipules narrowly ovate-lanceolate.

4. Capsule more or less woolly ..... 34. *V. pensylvanica.*

4. Capsule glabrous ..... 35. *V. p.* var *leiocarpa.*

3. Leaves broadly ovate, usually densely pubescent, basal ones usually wanting; upper half of stem densely pubescent; stipules ovate-oblong.

4. Capsule woolly ..... 32. *V. pubescens.*

4. Capsule glabrous ..... 33. *V. p.* var. *Peckii.*

3. Leaves cordate-ovate with deep sinus; flowers with a yellow eye, and violet tinge on the back; stipules lanceolate, entire. ..... 36. *V. canadensis.*

2. Flowers violet or cream-white, spur two or more times as long as thick; stipules sharply toothed or fringed.

3. Flowers cream-white with lavender striations; stipules toothed their entire length ..... 37. *V. striata.*

3. Flowers violet, purple, or lilac; stipules toothed mostly toward the base, or entire.

4. Lateral petals bearded; spur less than 8 mm. long.

5. Stems tufted, branches not forming stolons; leaves membranaceous, the upper reniform-ovate with rounded tips; stipules toothed; flowers pale violet.. ..... 38. *V. conspersa.*

5. Stems prostrate, stoloniferous and mat-forming; leaves subcoriaceous, small, ovate, with occasional hairs on upper surface; stipules small, sparingly toothed; flowers pale to deep violet ..... 39. *V. allegheniensis.*

4. Lateral petals beardless; spur slender, 0.9-1.8 cm. long; upper leaves ovate, tapering to apex; petals lilac with central violet spot ..... 40. *V. rostrata.*

2. Flowers yellow or bluish-white to cream; stipules leaf-like with dilated summit, pectinate or pinnatisect toward the base.
   3. Stipules pinnatisect at base; upper leaves crenate -serrate.
      4. Leaves mostly cordate at the base, petals equalling or slightly longer than the sepals, pale yellow ..... 42. *V. arvensis.*
      4. Leaves mostly cuneate at base; petals 2-3 times as long as the sepals, yellow, white, or purple ..... 41. *V. tricolor*
   3. Stipules palmately pectinate at base; upper leaves entire or nearly so; petals bluish-white to creamy, nearly twice as long as the sepals ..... 43. *V. Kitaibeliana* var. *Rafinesquii.*

1. HYBANTHUS CONCOLOR (Forster) Raf. Green Violet.

Tall perennial with alternate lance-oblong leaves and small (8 mm. long), fleshy, greenish flowers in axillary clusters of 1-3.

Habitat.—Moist rich woods or calcareous slopes.

Distribution.—Infrequent, but rather widely distributed over the southern part of our region. Not found on uplands or in the high plateau region. Allegheny Co.: sixteen localities. Beaver Co.: five localities, in the southern half. Armstrong, Greene, Warren, and Washington counties: one locality each. Fayette Co.: three localities, in the mountainous part. Somerset Co.: two localities. Westmoreland Co.: four localities, west of the mountains.

2. VIOLA PEDATA L. Birdfoot Violet.

Two upper petals of flowers dark violet and reflexed, other petals pale to deep lilac-purple; orange tips of stamens conspicuous. This is the loveliest of all our violets.

Habitat.—Red shaly soil of roadside cuts, or in abandoned fields of red to brownish shaly soil.

Distribution.—Bedford Co.: seven localities, in the southern part. Fulton Co.: along Rt. 30 at Harrisonville, May 20, 1950, LKH, WEB. Huntingdon Co.: along E. Broad Top R. R., near entrance to Rocky Ridge Tunnel, southwest of Coles Summit, May 17, 1952, DEL.

3. VIOLA PEDATA var. LINEARILOBA DC.

All petals pale blue or bluish-lilac; leaves dissected nearly to base into linear divisions.

Habitat.—Same as the species.

Distribution.—We have six records from Bedford Co., five from Fulton Co., and two from Huntingdon Co. (Warriors Ridge near Petersburg, June 1, 1868, Mollie Orlady, and with species southwest of Coles Summit, May 17, 1952, DEL.

4. VIOLA CUCULLATA Ait. Marsh Blue Violet. Plate 1, fig. 3.

Plant glabrous or with scattered hairs on petioles, peduncles, and upper leaf surfaces; readily recognized in the field by the moist habitat and the violet-colored flowers, with dark eyespot, borne well above

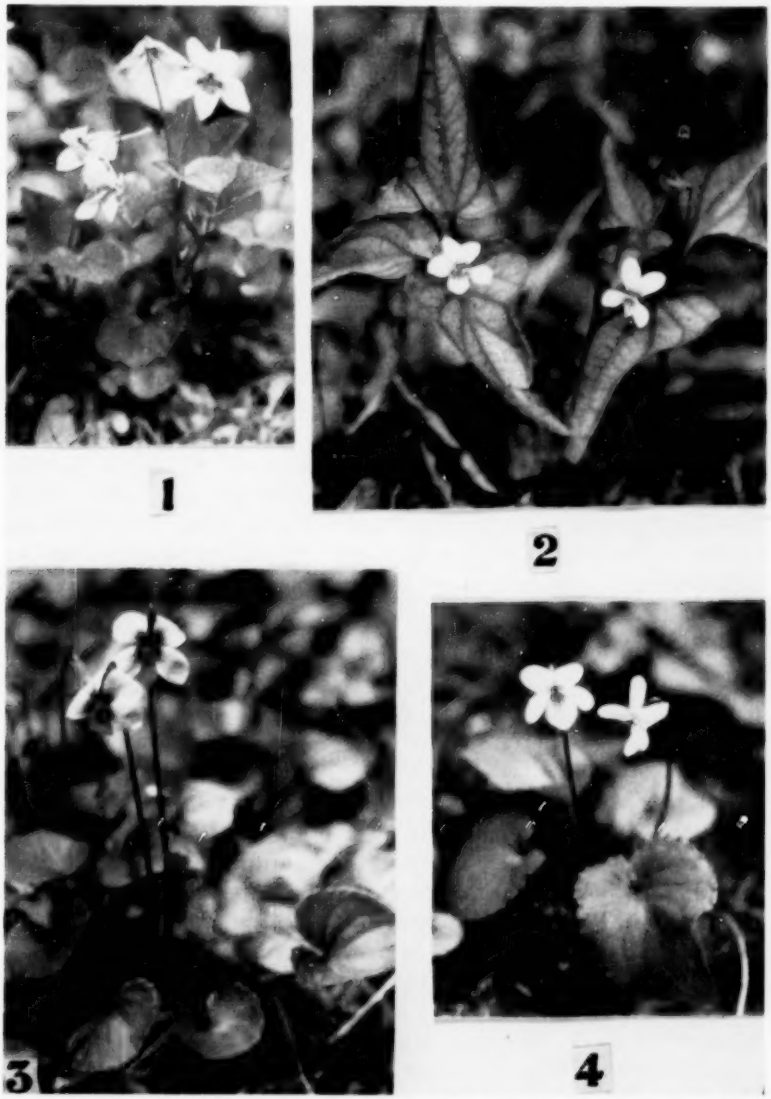


**Plate 2.** Fig. 1. Viola rostrata. Fig. 2. V. hastata. Fig. 3. V. cucullata. Fig. 4. V. blanda.

the leaves on long slender peduncles; buds nearly white; lateral petals bearded with clavate hairs having knoblike tips; sepals long lanceolate with prominent auricles.

Habitat.—Wet meadows, bogs, springy places, and in seepage from springs.

Distribution.—Common throughout our region, and represented in the Herbarium from all the counties except Cameron, Clinton, and McKean.

5. VIOLA CUCULLATA forma ALBIFLORA Britt.

Differs from the species in having white flowers.

Habitat.—Bog.

Distribution.—Erie Co.: bog, 2.5 mi. northeast of Union City, June 4, 1949, WEB.

6. VIOLA PAPILIONACEA Pursh. Meadow Blue Violet.

Entire plant smooth, or sometimes the petioles slightly pubescent in lines; edge of sepals white, not ciliate; flowers rich violet with white centers; leaves large, ovate or reniform, cordate at base, acute at tip.

Habitat.—Usually in moist soil of cultivated ground, roadsides, or meadows; often a weed in perennial flower gardens.

Distribution.—Well represented in the southwest corner of Western Pennsylvania. We have two collections from Erie and Indiana counties, and one collection from each of the following: Armstrong, Cambria, Clearfield, Jefferson, McKean, and Warren counties. Spring collecting in the counties not well represented in our collection would surely fill gaps in the distribution records.

7. VIOLA PAPILIONACEA forma ALBIFLORA Grover.

An albino form with white flowers and pale blue veins on lower petals.

Habitat.—Deciduous woods.

Distribution.—Allegheny Co.: Mt. Nebo district, May 5, 1949, LKH.

8. VIOLA PRICEANA Pollard. Confederate Violet.

Leaves cordate-ovate, tip obtuse or abruptly acute; petals pale grayish, heavily veined with blue at the base, often almost white at the tip. J. K. Small, in his *Manual of the Southeastern Flora*, points out that the color in this voilet is the exact reverse of that in *V. papilionacea*, and that it comes true from seed.

Habitat.—Along streams in woods, in meadows, and on roadside banks.

Distribution.—Allegheny Co.: Fox Chapel district, May 11, 1950, Mrs. J. B. Patterson. Bedford Co.: 1 mi southeast of Inglesmith, May 6, 1950, LKH, WEB; 1 mi. north of Imler, May 17, 1952, WEB.

Butler Co.: along Muddy Cr., on Rt. 422, 12 mi. west of Butler, May 18, 1952, LKH. Fayette Co.: 2 mi. west of New Salem, June 3, 1950, LKH, FHB. Greene Co.: along Dunkard Cr., 2 mi. northeast of Mt. Morris, and along Duley Run, 1.5 mi. northeast of Mt. Morris, Apr. 29, 1950, LKH, WEB; 3.5 mi. southwest of Deep Valley, Apr. 26, 1952, LKH, WEB. Lawrence Co.: Rock Point Park, 2 mi. south of Ellwood, May 3, 1952, LKH, WEB. Somerset Co.: along Piney Cr., 2.5 mi. east of Salisbury, and Compton Mills, west of West Salisbury, May 24, 1952, LKH, WEB.

9. VIOLA LATIUSCULA Greene. Broad-leaved Wood Violet.

Plant glabrous except for fine hairiness on upper part of the angled petioles and some stiff hairs on upper surface of the broadly cordate to triangular leaves; early leaves small, purplish beneath, in maturity becoming 1.5-6 in. wide; sepals ovate-lanceolate with smooth, white margins; flowers large, spurred petal somewhat villous.

Habitat.—Sandy or gravelly soil in dry, open, deciduous woods.

Distribution.—Rare in our region, since this is the southern limit of its range. Blair Co.: Kittanning Point, west of Altoona, May 27, 1922, OEJ. Erie Co.: under pines, 1.5 mi. north-northwest of Lowville, June 17, 1950, LKH, WEB. Indiana Co.: Pine Flats Station, 1 mi. south of Pine Flats, on Rt. 580, May 22, 1952, LKH, FHB. Somerset Co.: 1 mi. south of Sand Patch, June 1, 1946, LKH. Westmoreland Co.: about 5 mi. east of Ligonier, June 9, 1916, OEJ.

10. VIOLA AFFINIS LeConte. LeConte's Violet.

Plant glabrous or with scattered hairs on both the upper and the lower surfaces of the leaves; leaves narrowly cordate-ovate, tapering to acutish tips, older leaves round-ovate, margins crenate-serrate; spurred petal more or less villous at the base (often smooth); sepals acute, ovate-lanceolate with white margins and short rounded auricles; peduncles equalling, or shorter than, the leaves.

Habitat.—On alluvial flats, in wet woods, or on stream banks.

Distribution.—Found in a few widely separated localities in our region. Bedford Co.: 1 mi. north of Imler, May 17, 1952, WEB. Butler Co.: Ribold, May 8, 1925, JB. Erie Co.: Presque Isle, May 15, 1905, OEJ. Washington Co.: 5 mi. southeast of Houston, May 13, 1940, LKH.

11. VIOLA AFFINIS LeConte forma **albiflora**, f. nov.

Differt flores albis.

Differs from the species in having white flowers.

Habitat.—Moist flood-plain.

Distribution.—Butler Co.: along Muddy Cr. at Isle, May 18, 1950, LKH.

12. VIOLA SORORIA Willd. Downy or Wood Blue Violet.

Can be distinguished from *V. papilionacea* by the sepals, which are sparsely or evenly ciliate toward the base and on the auricles, and by the strigulose character of the petioles and particularly the lower surface of the expanding leaves. Specimens growing in open places are often nearly glabrous.

Habitat.—Moist, open meadows, low woods, and moist slopes.

Distribution.—Well distributed over the southern half of Western Pennsylvania, it has been collected in two localities only in Cambria, Crawford, and Huntingdon counties, and in one locality in Clearfield, Fulton, Jefferson, McKean, Potter, and Warren. These scattered locality records for the northern half indicate a lack of collecting.

13. VIOLA SEPTENTRIONALIS Greene. Northern Blue Violet.

Petioles and lower surface of young leaves sparsely hirsute and sometimes purplish, upper surface with scattered hairs; sepals obtuse, ciliate nearly to the tip; three lower petals bearded.

Habital.—Moist, often coniferous woods and wooded flood-plains.

Distribution.—A northern species that is rare in our region. Erie Co.: at top of escarpment above Elk Cr., at Rt. 98, May 26, 1951, WEB. Warren Co.: North Warren, May 25, 1944, H. N. Moldenke; Sulphur Springs Bog, 3 mi. northeast of Columbus, May 14, 1949, LKH, WEB.

14. VIOLA HIRSUTULA Brainerd. Southern Wood Violet.

Easily recognized by the dull green, round-ovate leaves, purplish beneath when young and with silvery strigose hairs above (often difficult to see); sepals white-margined and occasionally ciliate at base.

Habitat.—Dry soil in open woods on southern exposures, wooded pastures, clearings, and on clay banks.

Distribution.—Confined chiefly to the southwestern portion, with exception of Washington Co., from which no specimens are recorded. We have one record from each of the following counties: Crawford, Lawrence, Mercer, and Venango. There are two collections from each of the following: Blair, Centre, Fulton, and Huntingdon counties.

15. VIOLA HIRSUTULA Brainerd forma **albicans**, f. nov.

Differt flores albis et striais coerulis.

Differs from the species in having white flowers with blue veins.

Habitat.—Open woods.

Distribution.—Beaver Co.: near mouth of Little Beaver Cr., May 3, 1952, LKH.

16. VIOLA FIMBRIATULA Sm. Ovate-leaved Violet.

Leaves, petioles, and peduncles usually hairy at flowering time, ovate and crenate at first, becoming oblong-ovate to triangular and variously incised at base; sepals and their auricles ciliate. Reliance

must be placed upon the ciliate sepals in distinguishing the unlobed and glabrous forms from *V. sagittata*.

Habitat.—Dry roadside banks, clearings and neglected fields, and in sterile soil of open hillsides.

Distribution.—Well represented in the southern half of Western Pennsylvania, with a scattered representation northward, but apparently infrequent on the High Plateau. Only one collection from each of the following counties: Blair, Clinton, Crawford, Erie, Fulton, and Jefferson.

17. Viola fimbriatula forma albescens Farw.

Flowers pale blue-gray with blue lines, some with dark eyespots; tips of petals becoming white.

Habitat.—Dry open woods.

Distribution.—Bedford Co.: along Sideling Hill Cr. at Silvermills, May 6, 1950, LKH, WEB. Fayette Co.: woods opposite Markleysburg Bog, 6 mi. southeast of Farmington, on Rt. 40, May 20, 1950, LKH, WEB.

18. Viola emarginata (Nutt.) LeConte. Triangle-leaved Violet.

Plant similar to *V. fimbriatula* and *V. sagittata* but glabrous, and leaves triangular with acute tip, the base not incised; three lower petals bearded at the throat; sepals narrowly ovate-lanceolate with smooth white margins and long backward-pointing, lobed auricles.

Habitat.—Dry open woods and hillsides.

Distribution.—Rare here. Allegheny Co.: near Natrona, July 22, 1900, JB. [Bedford Co.: reported near Osterburg by David Berkheimer.] Blair Co.: Mt. Wopsononock, near Altoona, May 28, 1922, JB. Fayette Co.: Ohiopyle, May 15, 1915, OEJ.

19. Viola sagittata Ait. Arrow-leaved Violet.

Plant usually glabrous, but sometimes with scattered pubescence on petioles and veins of lower-leaf surfaces; leaves long-petioled, lanceolate-oblong to narrowly lanceolate, 2-3 times as long as broad, crenate, early ones entire or minutely toothed at base, the later ones often sharply hastate-lobed at the base; sepals glabrous, their auricles not ciliate. The unlobed form of the leaf resembles that of *V. fimbriatula*, but the sepals are glabrous.

Habitat.—Damp or dry sandy or clayey woods, old fields, or clearings.

Distribution.—In widely scattered localities throughout our region, except on the High Plateau. We have many collections from Allegheny, Butler, Fayette, and Westmoreland counties; three from Beaver, Clarion, and Somerset; two from Erie, Greene, and Indiana;

and one from each of the counties Clarion, Crawford, Fulton, Huntingdon, Jefferson, Mercer, Venango, and Washington.

20. VIOLA TRILOBA Schwein. Three-lobed Violet.

Difficult to distinguish from *V. sororia* in early spring when all the leaves on one plant may be entire and purplish beneath, but careful observation of a patch will reveal a few older leaves that are pedately cut into three or five lobes; sepals ovate, slightly ciliate on margins; spurred petal villous or only sparsely hairy. (N.B.—A pedately cut leaf is one in which the veins from the upper segments join with the veins of the basal segment before they together join the midrib.)

Habitat.—Dry woodlands or thickets, or in rich soil of bottomlands.

Distribution.—Fairly common and widely distributed throughout the south and southwestern parts of our region. Collected in numerous localities in Allegheny, Beaver, Bedford, Butler, Fayette, Greene, and Westmoreland counties; three localities in Fulton Co.; two in Clarion, Somerset, and Venango counties; and one in Armstrong, Crawford, Erie, Huntingdon, Lawrence, and Warren counties.

21. VIOLA TRILOBA var. DILATATA (Ell.) Brainerd.

This variety resembles *V. palmata* in pubescence and leaf outline, but may be distinguished by having leaves pedately divided nearly to base into 5-7 or more narrow segments; often having entire early or late leaves.

Habitat.—Dry locations.

Distribution.—Rare here. Allegheny Co.: Douthett, May 26, 1913, JB.

22. VIOLA PALMATA L. Early Blue Violet.

Underside of leaves and petioles soft hairy when young, leaves palmately divided into 5-11 toothed segments; flowers borne above the leaves; sepals ovate, ciliate on margins. (N.B.—A palmately cut leaf is one in which the veins from the upper segments join the midrib before they join the veins of the basal segment.)

Habitat.—Dry woodland soil and wooded roadsides of our lowlands and slopes.

Distribution.—Sparsely distributed in the south and southwestern part of Western Pennsylvania. We have numerous collections from Allegheny, southeastern Beaver, Somerset, and eastern Westmoreland counties; two from Bedford, Fulton, and Somerset counties; and one from each of the counties of Butler, Centre, Fayette, and Huntingdon.

23. VIOLA PALLENS (Banks) Brainerd. Smooth White Violet.

Leaves small, round, and glabrous; lateral petals beardless, or occasionally with a few tufts of hair; upper petals obovate, not re-

flexed; mature petioles usually not streaked with red. The glabrous leaves, non-reflexed upper petals, and the wet habitat distinguish this violet from *V. blanda*, while the smooth leaves and beardless lateral petals separate it from *V. incognita* var. *Forbesii*.

Habitat.—Springy places in woods, wet flood-plains, and bogs.

Distribution.—Scattered throughout Western Pennsylvania, particularly in the mountains and high-plateau counties. We have from one to two collections from each of the following counties: Armstrong, Bedford, Cambria, Centre, Clearfield, Crawford, Erie, Forest, Huntingdon, Jefferson, McKean, Venango, and Warren.

24. VIOLA INCOGNITA Brainerd. Large-leaved White Violet.

Plant producing many runners and forming dense mats; petioles and lower surface of leaves pubescent when young; upper surfaces usually glabrous; lateral petals broad and bearded; flowers white.

Habitat.—Mountains and low moist woods or shaded creek banks.

Distribution.—Rare here. Somerset Co.: Allegheny Mt. near Buckstown, Oct. 1, 1938, OEJ.

25. VIOLA INCOGNITA var. FORBESII Brainerd.

Plant glabrous except for a few scattered hairs on upper surface of leaves; lateral petals bearded, which is an aid in distinguishing between this violet and *V. blanda*.

Habitat.—Mountainous woods or moist woodlands.

Distribution.—Represented by collections from a few scattered localities. Allegheny Co.: Glenshaw, Apr. 6, 1946, WEB. Clearfield Co.: 2 mi. south of Westover along Chest Cr., May 24, 1947, LKH. Indiana Co.: 1 mi. north of Commodore, along Rt. 80, May 22, 1952, LKH, FHB. Somerset Co.: Laurel Hill State Park, 4.5 mi. east of Jones Mills, May 13, 1950, LKH, WEB; along Kimberly Run, 2.5 mi. southwest of Somerset, May 13, 1950, LKH, WEB. Warren Co.: North Warren, May 14, 1943, and May 25, 1944, H. N. Moldenke.

26. VIOLA BLANDA Willd. Sweet White Violet. Plate 1, fig. 4.

Readily distinguished from the other stemless white violets by a scattering of stiff hairs on upper surface of the leaves, particularly on basal lobes; petioles and bases of peduncles not always reddish; lateral petals beardless but may have a few hairs at base, two upper ones narrow and definitely reflexed.

Habitat.—Cool ravines or shaded slopes of deciduous or coniferous woods.

Distribution.—Common throughout at least most of Western Pennsylvania. None has been recorded from Washington Co., although extensive collecting has been done there.

27. VIOLA LANCEOLATA L. Lance-leaved Violet.

Leaves elliptical, narrowed at both ends, 1-3 in. long and ¼-½ in. wide at flowering time; flowers, on reddish peduncles, white with purple veins on lower petals.

Habitat.—Stream banks and shores, wet crevices, ditches, rocks, moist meadows, and open bogs.

Distribution.—Scattered throughout Fayette Co. and distributed northward, chiefly along the river valleys, to Venango and Forest counties. Our Allegheny Co. specimens were all except one collected in the northeastern part of the county between 1884 and 1901; then in 1923, after a lapse of twenty-two years, one was collected on an island in the Allegheny R. near Aspinwall. None has been found in Allegheny County since then. We have one collection from each of the following counties: Beaver, Bedford, Clinton, Forest, Huntingdon, and Westmoreland; two from Armstrong and Clarion; three from Indiana and Venango.

28. VIOLA PRIMULIFOLIA L. var. ACUTA (Bigel.) T. & G. Primrose-leaved Violet.

Plant usually glabrous, with leafy stolons; leaves oblong to ovate, rounded to subtruncate at base, on winged petioles; petals white, the three lower veined with purple, laterals slightly bearded or beardless; long peduncles and petioles reddish.

Habitat.—Marshy places or wet banks, but occasionally in dry rocky places.

Distribution.—Commonly found at Ohiopyle and in other localities throughout Fayette Co., but rare elsewhere. Allegheny Co.: head of Neville Island, Ohio R., July 1898, JAS. Blair Co.: near Lloydsville, Oct., 19, 1901, JAS. Butler Co.: Plains Church, southeast of Evans City, on Rt. 528, Aug. 31, 1909, OEJ. Somerset Co.: collected in three localities—Lambertsville, Buckstown, and Bakersville.

29. VIOLA ROTUNDIFOLIA Michx. Round-leaved Yellow Violet.

Easily recognized by the small scarcely unrolled leaves at flowering time and the large ovate to round leaves that lie flat on the ground at maturity; flowers yellow.

Habitat.—Clay soil, or on stony slopes of cool rich mountainous woods.

Distribution.—Commonly found in the mountains, the plateau uplands, and the glaciated areas of our region. We have collections from all the Western Pennsylvania counties except Allegheny, Beaver, Bedford, Cameron, Centre, Clinton, Fulton, Mercer, Huntingdon, and Washington.

30. VIOLA ODORATA L. English or Sweet Violet.

**Introduced and naturalized from Europe, rarely escaping here.**

Spreads by leafy stolons. Leaves finely pubescent, broadly cordate; flowers violet, fragrant.

Habitat.—Pastures, moist woods, and along roadsides.

Distribution.—Rare here—not collected since 1925. Allegheny Co.: near Perrysville, March 30, 1889, A. Ziegler; Little Pine Cr. Road, 1 mi. west of Dorseyville, Apr. 9, 1922, and May 5, 1925, JB. Warren Co.: near Warren, Apr. 11 and May 10, 1893, O. W. Simpson (from collection of H.N. Moldenke, nos. 14,496 and 14,510).

31. VIOLA HASTATA Michx. Halberd-leaved Violet. Plate 1, fig. 2.

Easily recognized by the long-pointed, halberd-shaped leaves, and the lemon-yellow flowers; leaves often mottled with dark veins; stems often purple.

Habitat.—Mountainous woods and wooded uplands where soil is enriched by decaying leaves.

Distribution.—Common in the mountainous counties of the southeastern portion of Western Pennsylania. Among the non-mountainous counties, we have five records from Indiana, three from Mercer and Venango, two from Forest, and one from Butler, Crawford, Erie, Greene, and Jefferson.

32. VIOLA PUBESCENS Ait. Downy Yellow Violet.

Easily recognized by the downy stems that are leafless at base and bear two or four broadly ovate leaves at the top; petals yellow with purple veins; capsules white woolly.

Habitat.—In dry soil of rich mountainous woods and often in upland woods.

Distribution.—Scattered throughout Western Pennsylvania. Represented in the Herbarium by one or two collections from many counties. We have none from Washington Co., despite much collecting there.

33. VIOLA PUBESCENS var. PECKII House.

Differs from the species in the darker foliage and the smooth capsules.

Habitat.—Same as species.

Distribution.—We have one collection from each of six counties, but undoubtedly more records would be obtained if further collecting were done when the plants are in fruit. Blair Co.: near Altoona, May 1921, E. H. McClelland. Clarion Co.: woods, south of Clarion, Sept. 5, 1921, OEJ. Erie Co.: near Erie, July 12, 1879, G. Guttenberg. Forest Co.: Trunkeyville, Aug. 17, 1904, OEJ. Mercer Co.: near Clarks Mills, June 12, 1939, OEJ. Westmoreland Co.: Hillside, May 22, 1909, OEJ.

34. VIOLA PENSYLVANICA Michx. Smooth-stemmed Yellow Violet.

Easily distinguished from *V. pubescens* by the lateral spreading and more leafy stems, several basal leaves, and the slight pubescence.

Habitat.—Shady rocky slopes, wooded bottomlands, and open thickets.

Distribution.—Widely distributed over southern portion of Western Pennsylvania, and scattered throughout the northern section. We have one collection only from Elk, Forest, Venango, and Warren counties.

35. VIOLA PENSYLVANICA var. LEIOCARPA (Fern. and Wieg.) Fern.

Differs from the species in having smooth capsules.

Habitat.—Same as the species.

Distribution.—Scattered throughout the region—five localities in Indiana Co.; three in Greene; two in Beaver, Butler, Somerset, and Westmoreland; one in Allegheny, Cambria, Erie, Fayette, Lawrence, Potter, Warren, and Washington.

*V. pensylvanica* and *V. pubescens* are reported by authors to have a tendency to intergrade, yet Brainerd does not have a single yellow violet hybrid among the 82 he has described.

36. VIOLA CANADENSIS L. Canada or Tall White Violet.

Easily recognized by the reddish-violet tint on the back of the white petals; plant tall. Flowering season long—often blooming until September.

Habitat.—Moist mountain forests or wooded uplands, often forming dense colonies.

Distribution.—Well represented throughout the counties, with the exception of Greene, in which extensive collecting has been done.

37. VIOLA STRIATA Ait. Striped Violet.

Readily separated from the other leafy stemmed violets by the creamy white petals, the three lower veined with purple and the lateral bearded.

Habitat.—Low woods, meadows, and flood plains.

Distribution.—This is our most common leafy-stemmed violet, often blooming until August. Well represented in our region from counties in which extensive collecting has been done. We have no specimens from Cameron, Centre, Clarion, Clinton, Forest, Jefferson, and McKean counties.

38. VIOLA CONSPERSA Reichenb. American Dog Violet.

Readily separated from *V. rostrata* by the shorter spur (less than one-half inch long), pale violet flowers with bearded lateral petals, and stipules with spiny teeth chiefly on one side.

Habitat.—Damp shady woods or wooded flood-plains.

Distribution.—Well represented in most counties of Western

Pennsylvania, but at the present time [1953] there are no collections from Greene or Washington counties, nor from Cameron, Clarion, Clinton, Elk, and McKean counties on the High Plateau.

39. VIOLA **allegheniensis,** species nova. Mat-forming Blue Violet. Plate 2.

Recently this violet has been reported erroneously, first as *V. Walteri* (3) and later changed to *V. labradorica* (5). It can belong to neither of these species. Its stolomiferous and mat-forming habit exclude it from *V. labradorica,* and the absence of both the deeply

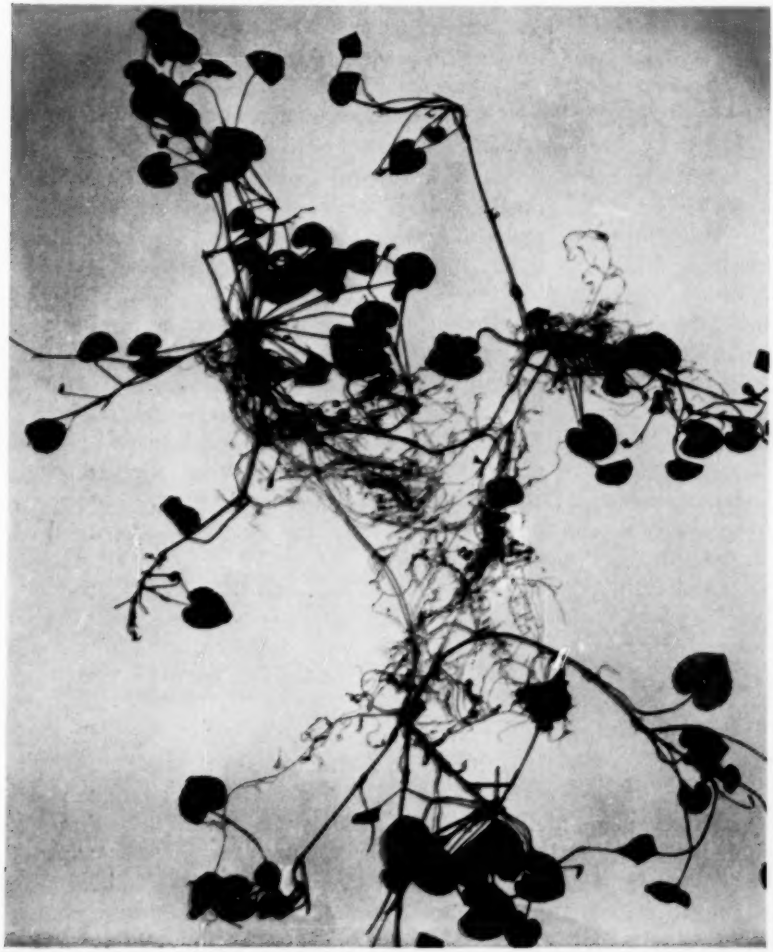

**Plate 2. Viola allegheniensis (Type).**

laciniate-toothed stipules and the dense covering of short white hairs over the leaves, petioles, and peduncles prevent it from being *V. Walteri*. Individual plants resemble small specimens of *V. conspersa*, but upon close examination stolons may be found connecting several plants.

Caudicibus prostratis, 5-6 cm. longis, stolonibus 13-14 cm. ad maturitatem; stirpe gracili, squamoso; foliis subcoriaceis, glabris sed cum paucis strigis super superiore superficie, non purpureis inferiore superficie, rotundis ad ovatum-cordatum, crenulatis, apice obtuso, 10 × 10 mm. vel 12-16 × 10-14 mm.; petiolis 2.5-3 cm. longis; stipulis 6-7 mm. longis, linearis-lanceolatis, fimbriatis gracilibus, spinosis dentibus; floribus 10-12 mm. longis, pedunculatis 2.5-6 cm. longis, corolla clara ad fuscam violaceam, lateralibus petalis barbatis, cornu 4-5 mm., calycie anguste ovato-lanceolato, apice obtuso; capsulis 4.5-6 mm., ovatis; seminibus 1.5 mm., albidis, paucis.

Hab.—Humis solis secus fluminem, in campis, omnibus patens silvis, vel paludibus montibus.

Plant prostrate, stoloniferous and mat-forming, seldom over 5-6 cm. high; roots and shoots arising from a slender, brown, scaly root-stalk; capsules few, since it reproduces chiefly by stolons, which reach a length of 13-14 cm. by end of growing season, leaves subcoriaceous, smooth except for occasional stiff hairs on the upper surface, not purplish beneath; blades round to ovate at flowering time, 10 × 10 mm., or others 12-16 mm. long × 10-14 mm wide; mature leaves 20-25 mm. long × 15-18 mm. wide, crenate, mostly heart-shaped at base, rounded at apex and seldom tapering; petioles 2.5-3 cm. long; stipules small, linear-lanceolate, 6-7 mm. long, tapering to a pointed apex, sparingly fringed with slender spiny teeth on both sides—average, 4 on one side, 3 on the other; peduncles 2.5-6 cm. long; flowers 10-12 mm. long, pale to deep violet; three lower petals white at base and veined with violet, the two lateral petals bearded at the throat, spur 4-5 mm. long; sepals narrowly ovate-lanceolate with entire white margins and blunt apex; capsules 4.5-6 mm long, ovate; valves 2 mm. wide; seeds 1.5 mm. long, white, very few.

Habitat.—Forms extensive mats on moist flood-plains, in old fields and open woods, or in bogs in the mountains.

Distribution.—Somerset County, Pennsylvania, southward through Garrett County, Maryland, to Nicholas County, West Virginia. Somerset Co.: flood-plain of Kimberly Run, 2.5 mi. southwest of Somerset (type locality), May 13, 1950, and Sept. 6, 1952, LKH, WEB; Big Springs Run Bog, Mt. Davis, May 27, 1950, WEB; wet ground, Lower Turkeyfoot Twp., June 1950, Richard Crist; near Trent, 1951,

R. Crist; 0.25 mi .northwest of Barronvale, Sept. 9, 1951, E. T. Wherry; near Compton Mills, northwest of West Salisbury, May 24, 1952, LKH, WEB; 1 mi. northwest of West Salisbury, Sept. 6, 1952, LKH, WEB.

The following collections from the West Virginia University Herbarium also represent this violet. Unless otherwise noted, the collections cited below were made by Dr. and Mrs. H. A. Davis. Pa.: Somerset Co., along road at edge of wood, Salisbury, May 31, 1941. Md.: Garrett Co., shady river bottom, Oakland, June 1, 1940. W. Va.: Preston Co., Masontown, May 9 and June 4, 1937, and in hillside pasture, Eglon, May 15, 1943; Tucker Co., in field, Canaan Valley, 6.5 mi. south of Davis, May 15, 1943, E. L. Core and E. A. Bartholomew; Grant Co. among alders, in glady area south of Mt. Storm, May 21, 1950, and on gravelly bank, 3.2 mi. southeast from Bayard, May 28, 1951, G. R. Fessenden and Mrs. Z. B. Evans; Webster Co., Cranberry R., Apr. 8, 1939; Nicholas Co., in Cottle Glade, near Craigsville, Apr. 20, 1946.

The type specimen is in the Herbarium of Carnegie Museum.

40. Viola rostrata Pursh. Long-spurred Violet. Plate 1, fig. 1.

Flowers pale lilac with dark eye, or often almost white; spurs one-half inch or more long; lateral petals beardless, veined with blue; stipules with spiny teeth on both margins.

Habitat.—Rich woods and shaded hillsides.

Distribution.—Well distributed in the southern part of Western Pennsylvania (with the exception of in Greene and Washington counties, where no specimens have been taken although much collecting has been done there), and extending northward along the western border through Erie and Warren counties.

41. Viola tricolor L. Johnny-jump-up.

Upper leaves oblong, cordate at base; stipules-pinnatisect at base; petals variously colored—yellow, white, purple—2-3 times the length of the sepals.

Habitat.—Persistent in old gardens, or escapes from cultivation.

Distribution.—Allegheny Co.: spontaneous in garden, North Side, Pittsburgh, June 26, 1946, WEB; in field, Glenshaw, May 13, 1928, JB. Beaver Co.: 3 mi. north of Baden at Legionville Hollow, May 30, 1922, E. H. Graham; established in garden, Freedom, July 29, 1889, JAS. Warren Co.: barren fields, Sulphur Springs Bog, 3 mi. northeast of Columbus, May 21, 1927, JB.

42. Viola arvensis Murr. Wild Pansy.

Leaves cuneate at base; stipules pinnatisect at base; distinguished from the following species by the pale yellow petals, equalling or but slightly longer than the sepals.

Habitat.—Naturalized from Europe and escaped into old fields or along roadsides.

Distribution.—Clarion Co.: Emlenton, May 23, 1925, JB. Crawford Co.: old field, Hathaway farm, Pymatuning, June 14, 1947, WEB. Somerset Co.: Downey, 0.75 mi. souht of Allegheny Tunnel on Pa. Turnpike, Sept. 10, 1949, LKH, WEB.

43. Viola Kitaibeliana var. Rafinesquii (Greene) Fern. Wild Field Pansy.

Basal leaves roundish, upper leaves ovate and wing-petioled; stipules nearly as large as the leaf and palmately pectinate at base (deeply cut on the sides but with a large entire tip); flowers vary from pale bluish-violet to cream colored; petals nearly twice as long as the sepals.

Habitat.—Dry fields and roadsides.

Distribution.—Some authors consider this violet to be native to eastern North America, while others state that it was naturalized from Eurasia. This is a winter annual that is widely distributed in southwestern Pennsylvania, but rare northward. We have four collections from Allegheny Co., three from Bedford and Westmoreland, two from Greene, and one from Erie, Fayette, and Fulton.

### Hybrids

Species of violets belonging in the same taxonomic section, when growing together, often hybridize and produce offspring which display more or less intermediate characters. In some crosses, for example, the leaves resemble those of the one parent, while the flower parts are characteristic of the other. These hybrids show increased vigor, but are often sterile. Ezra Brainerd, in his *Some Natural Violet Hybrids of North America*, published in 1924, discussed 82 hybrids which he had discovered over a period of twenty-two years, and many more hybrids have been noted since then. As Brainerd states, the number of described hybrids depends upon the botanist's good fortune to to visit the locality where the hybrid is growing.

#### Viola canadensis × pubescens

Flowers white with reddish-violet on the back of the petals, and with purple veins on the three lower petals as in *V. canadensis;* leaves 4-6, similar in shape to those of *V. pubescens*, glabrous, broadly ovate, oblique at base and tapering to a blunt apex, strigose pubescent beneath; stems glabrous. (This hybrid appears to have been unreported previously.)

Habitat.—Rich wooded uplands.

Distribution.—Fayette Co.: Killarney Park valley, near Indian Cr. Reservoir, May 30, 1920, OEJ.

VIOLA × CONTURBATA House

(*V. cucullata* × *sororia*)

Petioles and veins on lower surface of young leaves hairy, as in *V. sororia;* peduncles carrying the flowers well above the leaves as in *V. cucullata;* sepals narrow and sparingly ciliate.

Habitat.—Woods and wooded flood-plains.

Distribution.—Allegheny Co.: Liberty Borough, May 20, 1926, Elsie McClure. Armstrong Co.: 2.5 mi. northwest of West Lebanon, May 14, 1952, LKH, FHB. Westmorleand Co.: woods along Lloyalhanna Cr., above the dam, May 16, 1940, LKH.

VIOLA × CORDIFOLIA (Nutt.) Schwein.

(*V. papilionacea* × *hirsutula*)

Leaves strigose above and sepals often ciliate as in *V. hirsutula;* otherwise like *V. papilionacea.*

Habitat.—Open woods and wooded roadside banks, also shale barrens.

Distribution.—Bedford Co.: 2.5 mi. south-southwest of Hewitt, May 6, 1950, LKH, WEB. Huntingdon Co.: Coles Summit, about 2.5 mi. northwest of Saltillo, May 16, 1952, DEL. Lawrence Co.: New Wilmington, May 1901, Geo. Pavisen. Somerset Co.: Laurel Hill State Park, 4.5 mi. east of Jones Mills, May 13, 1950, LKH, WEB; near Compton Mills, northwest of West Salisbury, May 24, 1952, LKH, WEB. Westmoreland Co.: Lynn Run, 3 mi. southeast of Rector, May 13, 1950, LKH, WEB.

VIOLA × FERNALDII House

(*V. fimbriatula* × *sororia*)

Sepals sparingly ciliate toward base and on auricles; leaves both cordate-ovate and oblong-ovate on same plant, pubescent, and on pubescent petioles; peduncles sparsely hairy.

Habitat.—Wooded hillsides, fields, and flood-plains.

Distribution.—Allegheny Co.: Dawsons Knob, West Deer Twp., Sept. 26, 1916, OEJ. Butler Co.: flood-plain of Conoquenessing Cr., southwest of Ribold, May 19, 1917, OEJ. Cambria Co.: 3 mi. southeast of Martindale near Blair Co. line, May 31, 1950, LKH, FHB. Huntingdon Co.: about 2.5 mi. northwest of Saltillo, May 16, 1952, DEL. Washington Co.: field, 3 mi. northwest of Washington, May 2, 1940, LKH.

VIOLA HIRSUTULA × SAGITTATA

Leaves of two kinds on same plant: some round-ovate and purplish beneath, others oblong-lanceolate and somewhat strigose above. Sepals glabrous; flowers dark blue, spurred petal bearded.

Habitat.—Open woods.

Distribution.—Indiana Co.: along Ramsey Run on Rt. 259, 1.5 mi. north of Rt. 22, May 9, 1952, LKH, FHB.

VIOLA × NAPAE House

(*V. sororia* × *papilionacea*)

Petioles and lower surfaces of leaves sparingly pubescent; sepals ovate-lancelate, white-margined and entire or ciliate.

Habitat.—Dry soil in deciduous woods and on roadside banks.

Distribution.—Allegheny Co.: Mt. Nebo district, May 5, 1949, LKH. Beaver Co.: near intersection of Beaver and Ambridge roads, May 11 and June 15, 1949, LKH. Greene Co.: along Pursley Cr., 2.5 mi. north of Oak Forest, May 22, 1951, LKH, FHB. Huntingdon Co.: Coles Summit, about 2.5 mi. northwest of Saltillo, July 4, 1949, and July 30, 1949, DEL. Lawrence Co.: Rock Point Park, 2 mi. south of Ellwood, May 3, 1952, LKH, WEB.

VIOLA × PERPERA House

(*V. hirsutula* × *sororia*)

Petioles and veins on lower surface of leaves hairy as in *V. sororia;* upper surface of leaves strigose-hispid as in *V. hirsutula;* sepals more or less ciliate.

Habitat.—Moist open woods and clearings.

Distribution.—Allegheny Co.: Wildcat Falls Hollow, 2 mi. southwest of McKees Rocks, Apr. 27, 1941, OEJ. Blair Co.: Tyrone, May 17, 1904, OEJ. Crawford Co.: Linesville, May 10, 1906, OEJ. Erie Co.: 4 mi. northeast of Union City, June 3, 1950, FHB. Greene Co.: 2 mi. southwest of Jefferson, May 17, 1950, LKH, FHB. Indiana Co.: 1 mi. west of Vintondale, May 9, 1952, LKH, FHB. Westmoreland Co.: Hillside, May 19, 1906, and May 23, 1912, OEJ; Rock Run, 3 mi. southeast of Rector, Apr. 26, 1925, OEJ.

VIOLA × PORTERIANA Pollard

(*V. fimbriatula* × *cucullata*)

Leaves triangular to ovate-oblong, lower surface hairy and on hairy petioles as in *V. fimbriatula;* flowers on long peduncles, lateral petals bearded with club-shaped hairs as in *V. cucullata.*

Habitat.—Moist woodland soil.

Distribution.—Allegheny Co.: Brush Cr. Swamp near Douthett, May 14, 1906, OEJ. Beaver Co.: along lower Raccoon Cr., May 17, 1924; J.B. Fayette Co.: Glade Run Bog region, 4 mi. northwest of Deer Lake, June 10, 1950, LKH, WEB; Laurel Run below Wymp's Gap, 1 mi. north of W. Va. line, Aug. 24, 1940, OEJ, J. F. Lewis; Markleysburg Bog region, 6 mi. southeast of Farmington, on Rt. 40, Sept. 1, 1946, OEJ. Fulton Co.: along Little Tonoloway Cr., near Whip's Cove, May 20, 1950, LKH, WEB. Huntingdon Co.: Coles Summit,

about 2.5 mi. northwest of Saltillo, May 10, 1948, and May 29, 1949, DEL. Westmoreland Co.: Laurel Hill near Laughlintown, May 20, 1930, W. R. Van Dersal.

VIOLA × REDACTA House

(*V. fimbriatula* × *hirsutula*)

Leaves ovate to triangular, some round-ovate, glabrous to sparsely pubescent on lower surfaces, hirsute above; petioles somewhat pubescent; sepals somewhat ciliate to nearly devoid of cilia; spurred petal with a few scattered hairs.

Habitat.—Dry wooded slopes.

Distribution.—Huntingdon Co.: Coles Summit, about 2.5 mi. northwest of Saltillo, May 10, 1948, May 30, 1949, and May 6, 1950, DEL. Somerset Co.: Laurel Hill State Park, 4.5 mi. east of Jones Mill, May 27, 1950, WEB.

VIOLA ROSTRATA × STRIATA Brainerd

Leaves ovate-cordate, some rounded, others tapering to apex; flowers large, pale violet with darker lines, lateral petals bearded as in *V. striata;* spur about 8-10 mm. long, usually slender and often hooked as in *V. rostrata.*

Habitat.—Wooded flood-plains and springy swamps.

Distribution.—Butler Co.: along Little Buffalo Cr. at Monroe Station, May 25, 1950, LKH, FHB. Fayette Co.: Killarney Park near Indian Cr. Reservoir, May 30, 1921, E. H. McClelland. Indiana Co.: south branch of Plum Cr., 1.5 mi. east of Willet, June 3, 1952, LKH, FHB. Lawrence Co.: Rock Creek Park 2 mi. south of Elwood, May 3, 1952, LKH, FHB; along Neshannock Cr., 2 mi. east of Eastbrook, May 11, 1952, LKH. Somerset Co.: Harnedsville, May 27, 1950, WEB; Big Spring Run Bog, Mt. Davis region, May 27, 1950, FHB; 6 mi. east of Wellersburg near Bedford County line, May 16, 1952, LKH, FHB; near Compton Mills, northwest of West Salisbury, May 27, 1952, LKH, WEB.

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HERBARIUM, CARNEGIE MUSEUM
PITTSBURGH 13, PENNSYLVANIA

# A Preliminary Report of the Ferns and Their Allies in Polk County, North Carolina*

Oliver M. Freeman

*Equisetaceae, horsetail family*

Equisetum hyemale L. var. affine (Engelm.) A. A. Eaton. Common Scouring Rush. Only one collection previous to 1951 from near Columbus. This plant is frequent in sandy soils along many streams. Dense colonies have been observed along the Green River and near Tryon.

Equisetum arvense L. Common horsetail. A plant that appears to be this species is frequent in the sands along the Green River. Fertile stems have not yet been found.

*Lycopodiaceae, clubmoss family*

Lycopodium lucidulum Michx. Shining Clubmoss. Infrequent in cool mountain woods. Specimens from White Oak Mt., Melrose Mt. and Brushy Ridge in nearby Greenville County, South Carolina.

Lycopodium porophilum Lloyd and Underw. was reported from White Oak Mt. in 1925. Specimen not seen by this writer.

Lycopodium flabelliforme (Fern.) Blanch. Groundpine. Specimen collected November 1952 in low pine woods near Sandy Plains. Observed also near Lake Lanier, Lake Adger and Melrose Mt.

Lycopodium tristachyum Pursh. Groundcedar. Perhaps rare but locally very abundant along the summit of the Blue Ridge at the northwest edge of the county. Identification verified by Dr. E. T. Wherry.

*Selaginellaceae, spikemoss family*

Selaginella apoda (L.) Fern. Filmy-leaf Spikemoss. Very abundant on moist soil and wet rocks. Specimen No. 51279 from near Pea Ridge.

Selaginella rupestris (L.) Spreng. Rock Spikemoss. Frequent on exposed rock surfaces that are not too steep. Makes its best development on nearly level surfaces having shallow basins that hold water briefly after rains.

*Isoetaceae, quillwort family*

Isoetes englemanni A. Br. Collected only once, on White Oak Mt. Biltmore Herbarium 5564, May 5, 1897.

*Ophioglossaceae, adder's-tongue family*

Botrychium virginianum (L.) Sw. Early Grapefern. Abundant in rich woods throughout the county.

*Contribution from the Pearson's Falls Herbarium, Tryon, N. C.

BOTRYCHIUM OBLIQUUM Muhl. Common Fall Grapefern. Several excellent fruiting specimens have been collected in widely separated parts of the county. Seems to prefer thin woods where leaf mold is not too thick.

*Osmundaceae, flowering-fern family*

OSMUNDA REGALIS L. var. SPECTABILIS (Willd.) Gray. Royal Fern. Common in deep loose soils which are permanently wet but not stagnant.

OSMUNDA CLAYTONIANA L. Interrupted Fern. Infrequent. Collected only by Townsend near Columbus in 1899 until collected in 1951 on the west face of Wildcat Spur, a part of the Blue Ridge in the northwest part of the county. Here is a large colony growing in woods on a moist slope.

OSMUNDA CINNAMOMEA L. Cinnamon Fern. Frequent, especially in the western part of the county. Locally abundant and often associated with the Royal Fern along the Green River. The forma FRONDOSA (T.&G.) Britt, has been collected near Caesar's Head in Greenville County, South Carolina.

*Hymenophyllaceae, filmy-fern*

TRICHOMANES BOSCHIANUM Sturm. This rare filmy fern was found in the northwestern part of the county. The exact location is being kept secret for reasons of security. The colony is relatively large but has been severely injured by two years of severe drouth. According to my information, the only other station for this plant in North Carolina is in Macon County.

*Polypodiaceae, fern family*

WOODSIA SCOPULINA D. C. Eaton. Mountain Cliff-fern. Rare on White Oak Mt. Collected in 1897 by E. C. Townsend and Dr. E. T. Wherry in 1934.

WOODSIA OBTUSA (Spreng.) Torr. Common Woodsia. Infrequent. White Oak Mt. and valley of the North Pacolet River near Melrose Station. Specimen collected near the confluence of Bullin Creek and the Green River in November 1952. This fern reaches its best development in loose soil of moist talus slopes but is also found at cliff bases and on moist rock ledges.

CYSTOPERIS FRAGILIS (L.) Bernh. var. MACKAYII Lawson. Brittle Fern. Frequent in cool moist glens.

DRYOPTERIS NOVEBORACENSIS (L.) Gray. New York Fern. Common in woods and thickets.

DRYOPTERIS HEXAGONOPTERA (Michx.) Christens. Broad Beechfern. Frequent in woods.

DRYOPTERIS INTERMEDIA (Willd.) Gray. Evergreen Woodfern. Apparently rare. Specimens collected at the base of Bushy Ridge in northestern Greenville County, South Carolina, a half mile south of the Polk County line.

DRYOPTERIS MARGINALIS (L.) Gray. Marginal Shield-fern Frequent on wooded hillsides, especially on north facing slopes.

POLYSTICHUM ACROSTICHOIDES (Michix.) Schott. Christmas Fern. Common everywhere on wooded slopes.

DENNSTAEDTIA PUNCTILOBULA (Michx.) Moore. Hay-scented Fern. Common in woods and in thickets along streams.

ATHYRIUM THELYPTEROIDES (Michx.) Desv. Silvery Spleenwort. Infrequent in shady mountain ravines. Much less frequent than the next.

ATHYRIUM FILIX-FEMINA (L.) Roth var. ASPLENIOIDES (Michx.) Farw. Southern Ladyfern. Frequent in moist rich soil.

CAMPTOSORUS RHIZOPHYLLUS (L.) Link. Walking Fern. Frequent on rocks along shaded streams in the western part of the county.

ASPLENIUM TRICHOMANES L. Maidenhair Spleenwort. Not very common on shaded rocks in mountainous parts of the county.

ASPLENIUM PLATYNEURON (L.) Oakes. Ebony Spleenwort. Common in woods, fields and banks throughout the county. Dr. E. T. Wherry has pointed out that Brownstem Spleenwort would be a more accurate name.

ASPLENIUM MONTANUM Willd. Mountain Spleenwort. Specimen collected December 1, 1952 on a rock ledge along Ostin Creek in Polk County. Previously reported from Hogback Mt. in Greenville County, South Carolina.

ASPLENIUM PINNATIFIDUM Nutt. Lobed Spleenwort. Specimens collected by Miss Kimber in 1930 on Hogback and Clarke Mts., Greenville County, South Carolina.

ASPLENIUM RESILIENS Kunze. Blackstem Spleenwort. Reported as having been found by Frederick H. Horsford in December 1891. This writer doubts whether this fern has ever been collected in this region. He has collected it numerous times on limestone and there is no limestone in this region.

WOODWARDIA AREOLATA (L.) Moore. Dwarf Chainfern. Apparently infrequent but perhaps overlooked. Collected by D. C. Peattie "in a marsh on top of a hill, on the state line" August 1921. Fruiting specimen collected by the writer in October 1952 near the margin of Lake Lanier in extreme northeastern Greenville County, South Carolina, half a mile from the Polk County line.

CHEILANTHES LANOSA (Michx.) Watt. Hairy Lipfern.

CHEILANTHES TOMENTOSA Link. Woolly Lipfern.

Both of these lipferns are found frequently on exposed rocks at elevations of 1000 to 3000 feet but most frequently on the higher cliffs. Based on local material, the two plants appear distinct and not a single species as treated in Gray's Manual of Botany, 8th edition.

ADIANTUM PEDATUM L. Maidenhair. Common in cool woods and glens. Reaches perfection in rich moist soils having a north facing slope.

PTERIDIUM LATIUSCULUM (Desv. Maxon. Eastern Bracken. Common in poor soils throughout the county.

POLYPODIUM VIRGINIANUM L. Rock Polypody. Frequent on rocks in partly shaded locations, especially in cool glens.

POLYPODIUM POLYPODIOIDES (L.) Watt. Resurrection Fern. Frequently on trees and rocks throughout. Some writers apparently prefer to treat our resurrection fern as variety michauxianum Weath.

Unless otherwise indicated, one or more specimens of all the above items are on deposit in the Pearson's Falls Herbarium.

## ADDITIONAL NOTES

OSMUNDA CLAYTONIANA. L. This plant covers several acres of forest floor on Sugarloaf Mt. within one mile of the Polk County line in Henderson County. This fern has been observed in other parts of Polk County is more frequent than indicated by earlier observations.

WOODSIA SCOPULINA D. C. Eaton. Collected by the writer on Tryon Mt. about 300 yards below the summit of the peak. This is the plant now called Woodsia appalachiana T.M.C. Taylor but may possibly be only a variant of the older species. A specimen of this fern collected by the writer on White Oak Mt. in 1952 was sent to Dr. E. T. Wherry who verified the identification.

ASPLENIUM PINNATIFIDUM Nutt. Relocated on Clarke Mt. in nearby South Carolina. Specimen collected December 1952.

ASPLENIUM MONTANUM Willd. Specimen collected April 15, 1953, on cliffs at the eastern end of Bushy Ridge in Polk County.

WOODWARDIA AREOLATA (L.) Moore. More than an acre of ground in a swampy place three miles southeast of Columbus is covered with this fern. Specimen 53281 collected July 17, 1953.

TRYON, N. C.

## Shale-barren Plants on Other Geological Formations

EDGAR T. WHERRY

The publication of Dr. Core's copious records of shale-barren plants* suggests the placing on record of observations as to the occurrences of these plants on other formations than the barrens underlain by Devonian Brallier shale.

ALLIUM OXYPHILUM.—The type locality is in residual clay over shaly limestone; that in Giles Co., Va., on Silurian sandstone

ERIOGONUM ALLENII.—Occurrences in Shenandoah Co., Va., are on Ordovician Martinsburg shale; all others, however, appear to be on the Brallier.

CLEMATIS ALBICOMA.—So far as known this is wholly restricted to typical Brallier barrens.

CLEMATIS "ALBICOMA var. COACTILIS."—As this taxon really bears no close relationship to *C. albicoma*, its status needs further study. Few of its stations are on Brallier shale, it being chiefly found on soft shale, sandstone, and limestone of various geologic ages.

CLEMATIS VITICAULIS Steele. (not listed by Core).—The most restricted endemic of all the plants here discussed, this taxon is known only on the Brallier barrens from ½ mile west to 3 miles northeast of Millboro, Bath Co., Va.

ARABIS SEROTINA Steele (not listed by Core).—Known to the writer on the Brallier shale from Craig to Highland Co., Va.

ASTRAGALUS DISTORTUS.—Occurs on a wide variety of formations and indeed seems to be on a real Brallier barren only at the Mineral Co., W. Va., station.

TRIFOLIUM VIRGINICUM.—Known to spread from the Brallier to the Martinsburg in Shenandoah Co., Va.

OENOTHERA ARGILLICOLA.—While chiefly on the Brallier, this grows on the Martinsburg in Va. and on soft Devonian shales in Pa.

PSEUDOTAENIDIA MONTANA.—Few of the localities of this unique taxon are actually on Brallier barrens, it being known on other shales, on sandstone, on limestone, and even, in Va., on granite.

CONVOLVULUS PURSHIANUS.—While abundant on the Brallier, this has been noted in both Va. and Md. on limestone, and in Pa., where now known in several counties not listed by Core, on shales of various ages.

PHLOX BUCKLEYI.—This scarcely occurs on true barrens, being found chiefly in wooded areas adjacent to these. At all stations seen, however, the underlying rock was Brallier or a similar shaly sandstone.

*Castanea 17:105-116. 1952.

ASTER SCHISTOSUS.—The status of this taxon is in doubt; it was not included by Core, and in the ecological study of the barrens by Platt* was inadvertently listed as *A. lowrieanus*. While the latter grows on many formations, its relative *A schistosus* is reported only on Brallier barrens.

SENECIO ANTENNARIIFOLIUS.—Occasionally strays from Brallier barrens, having been observed in Va. on Martinsburg shale, on limestone and on gneiss, and in the second known Pa. station on sandstone.

SOLIDAGO HARRISSII.—This early-blooming goldenrod grows on the Brallier at a few of its stations, but also occurs on other Devonian shales and on the Ordovician Martinsburg.

The foregoing notes bring out the fact that many of the taxa concerned are not restricted to Brallier shale-barrens, and suggest the interpretation that their frequent occurrence on these is the result of competition elsewhere. In other words, they grow on the barrens not because such habitats are necessary (or even favorable) for them, but because they are unable to survive in the midst of the vegetation of less barren areas.

This view is seemingly supported by experiences in growing certain of them in rock gardens. Mrs. J. Norman Henry, at Gladwyne, Pa., and the writer elsewhere, have cultivated several in materials wholly lacking hard shale flakes such as are typical of the barrens. The ones which have grown successfully, as judged by the appearance of seedlings, are: *Allium oxyphilum, Eriogonum allenii, Oenothera argillicola, Phlox buckleyi, and Senecio antennariifolius.* Finally, it may be noted that *Convolvulus purshianus* spreads so profusely by rhizomes that it is better not placed in the rock garden at all.

UNIVERSITY OF PENNSYLVANIA.

## Taxonomy of Scrophularia Marilandica L. and S. Lanceolata Pursh

WILLIAM D. CREASY,

Upon superficial examination *S. marilandica L.* and *S. lanceolata* Pursh bear marked resemblances thus causing confusion of these two species of plants for many years during the early development of botany in this country. Along with the confusing of the two species was an inevitable confusing of their names. At present the late blooming species bears the name *S. marilandica* L. and the early blooming species *S. lanceolata* Pursh. This paper deals with the series of events leading up to the present classification.

*Ecol. Mon. 21:286, 1951.

Michaux (1803), who considered this plant (or these plants) to be a variety of the European *S. nodosa* L., wrote as follows:

Cal. 5-fidus. Cor. subglobosa, resupinata.

Caps. 2-locularis.

Nodosa: *β* americana. S. foliis ovalibus, basis obtusis; petiolis inferne pubescentibus: paniculae fasciculis laxe paucifloris.

Obs. *S. marilandica* Linn. Hujus videtur varietas. Hab. in Virginia, Kentucky et rarius in Carolina.

Pursh (1814) recognized two species of the Northeastern American figwort. He called the late blooming species *S. marilandica* and the early blooming species *S. lanceolata*. His descriptions are as follows:

1. S. foliis cordatis serratis acutis basi *marilandica* rotundatis, petiolis inferne ciliatis, paniculae fasciculis laxe paucifloris.—Willd. sp. pl. 3. p. 269.

   S. nodosa americana. *Mich. fl. amer.* 2. p. 21.

   In low grounds: Pennsylvania to Carolina June-Aug. v. v. Flowers greenish-brown. The plant often more than four feet high.

2. S. foliis lanceolatis inaequaliter serratis *lanceolata* acuminatis basi acutis, petiolis nudis, paniculae fasciculis corymbosis. In wet meadows and woods: Pennsylvania. Aug.-Sept. v.v. Flowers greenish-yellow.

Nuttall (1818) recognized two species and followed Pursh's classification. Darlington (1826, 1837, 1853) recognized only one species. He used the name *S. marilandica* L. in the first and second editions but changed the designation to *S. nodosa* L. in the third. He stated that "This (meaning the American figwort) is now regarded as not sufficiently distinct from the *S. nodosa*, of Europe." Wood (1877) recognized only one species for which he used the name *S. nodosa*. Gray (1848, 1856, 1858, 1865, 1867) in his first edition of the *Manual of the Botany of Northern United States* called this plant *S. nodosa*, and this name was retained through the fifth edition. In the sixth edition, a revision by Watson and Coulter (1890), the name was changed to *S. nodosa var. marilandica* L. In the seventh edition, Robinson and Fernald (1908), two species were recognized, the late blooming species called *S. marilandica* L. and the early blooming species designated *S. leporella* Bicknell. In the eighth edition, Fernald (1950), the names *S. marilandica* L. and *S. lanceolata* Pursh were used. Britton and Brown (1898, 1913) used the names *S. marilandica* L. and *S. leporella* Bicknell.

Bicknell (1896) offered the first adequate description of *S. lanceo-*

*lata* Pursh (*S. leporella*, by his designation). He retained for the late blooming species the name *S. marilandica* and named the early blooming species *S. leporella* because of the resemblance of the flower to a little rabbit when viewed from the side. He was aware of Pursh's treatment of the two species but believed Pursh had described a narrow-leaved form of *S. marilandica* and named it *S. lanceolata* In discussing Pursh's description Bicknell (1896) wrote as follows: "Not only is no one of the essential characters of this plant defined (meaning *S. leporella*, by his own designation) but the flowering period given by Pursh—'Aug.-Sep.'—is alone conclusive against his *S. lanceolata* being the same as our species which flowers in May and June."

Pennell (1922) was also aware of Pursh's description but did not concur with Bicknell's interpretation. He retained Pursh's name for *S. lanceolata* and reasoned that there was an error in the transfer of the flowering date from species to species as the book passed through the press or in the process of Pursh's own labelling. Pennell states that: ". . . all efforts to discover Pursh's types have failed. . . . "

In the opinion of the present writer there is no doubt that there are two distinct species of these Northeastern figworts as determined as experimentation, both physiological and morphological in nature, and as described by Bicknell (1896). As to the naming, it appears that Pennell's (1922) reasoning concerning Pursh's (1814) naming of the two species is correct, making *S. lanceolata* Pursh the valid name for the early blooming species.

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